

SYSTEMATIC REVIEW

Trim: D16/11134

Resident-to-resident physical aggression leading to injury in nursing homes: a systematic review

NOHA FERRAH¹, BRIONY J. MURPHY¹, JOSEPH E. IBRAHIM¹, LYNDAL C. BUGEJA¹, MARGARET WINBOLT², DINA LOGIUDICE³, LEON FLICKER^{4,5}, DAVID L. RANSON¹

¹Department of Forensic Medicine, Monash University and Victorian Institute of Forensic Medicine, 65 Kavanagh Street, Southbank, Victoria 3006, Australia

²The Victoria and Tasmania Dementia Training Study Centre, Australian Centre for Evidence Based Aged Care, Australian Institute for Primary Care and Ageing, Faculty of Health Sciences, La Trobe University, Melbourne, Victoria 3086, Australia

³National Ageing Research Institute and Melbourne Health, Melbourne, Victoria, Australia

⁴Western Australian Centre for Health and Ageing, Western Australian Institute for Medical Research, University of Western Australia, Crawley, Western Australia, Australia

⁵Royal Perth Hospital, Perth, Western Australia, Australia

Address correspondence to: B. J. Murphy. Tel: (+61) 3 9684 4377; Fax: (+61) 3 9684 4475. Email: briony.murphy@monash.edu

Abstract

Background: resident-to-resident aggression (RRA) is an understudied form of elder abuse in nursing homes.

Objective: the purpose of this systematic review was to examine the published research on the frequency, nature, contributing factors and outcomes of RRA in nursing homes.

Methods: in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Statement, this review examined all original, peer-reviewed research published in English, French, German, Italian or Spanish between 1st January 1949 and 31st December 2013 describing incidents of RRA in nursing homes. The following information was extracted for analysis: study and population characteristics; main findings (including prevalence, predisposing factors, triggers, nature of incidents, outcomes and interventions).

Results: eighteen studies were identified, 12 quantitative and 6 qualitative. The frequency of RRA ranged from 1 to 122 incidents, with insufficient information across the studies to calculate prevalence. RRA commonly occurred between exhibitors with higher levels of cognitive awareness and physical functionality and a history of aggressive behaviours, and female targets who were cognitively impaired with a history of behavioural issues including wandering. RRA most commonly took place in the afternoon in communal settings, was often triggered by communication issues and invasion of space, or was unprovoked. Limited information exists on organisational factors contributing to RRA and the outcomes for targets of aggression.

Conclusions: we must continue to grow our knowledge base on the nature and circumstances of RRA to prevent harm to an increasing vulnerable population of nursing home residents and ensure a safe working environment for staff.

Keywords: *nursing home, aggression, resident-to-resident, death, physical injury, older people, systematic review*

Introduction

Elder abuse, the mistreatment of older people, affects over 100,000 older adults each year in the United Kingdom [1]. The global prevalence of elder abuse is unknown as under-reporting is estimated to be as high as 80% [2]. Approximately half of abuse violations are ‘serious enough to cause actual harm to the residents or to place them in immediate jeopardy of death or serious injury’ [3].

Elder abuse is prevalent in vulnerable older people with cognitive impairment residing in institutional settings [4]. By 2050, 115.4 million people worldwide will have dementia [5] with as many as half living in nursing homes [6].

The types of elder abuse are broadly classified according to the setting (community and institutional), nature of abuse (physical, sexual, emotional and financial) and perpetrator (family, care provider or stranger, including other older adults) [7]. An understudied issue is abuse among older adults living

in nursing homes [3], often referred to as resident-to-resident aggression (RRA) and defined as 'Negative, aggressive and intrusive physical, sexual, verbal, and material interactions between long-term care residents that in a community setting would likely be unwelcome and potentially cause physical or psychological distress or harm in the recipient' [8, 9].

While RRA is a form of 'assault', the issue of 'intent' in this context is contentious as the presence of cognitive impairment in residents means it is often not possible to establish the actions of the person exhibiting aggression (hereafter referred to as the 'exhibitor') were conscious, voluntary and intended to result in harm to the target of aggression (hereafter referred to as the 'target').

RRA is a collective organisational and social failure to protect and preserve the rights of vulnerable older people in nursing homes. Any form of assault leads to increased morbidity and mortality in an older person [4]. There are also social and economic costs of interpersonal violence. In the nursing home setting, this may lead to a poorer quality of life for residents, increased staff turnover (due to feeling unsafe in the workplace), a reluctance to admit complex residents, expending of limited health and legal resources and the community losing confidence in the provision of care [10].

RRA is a common occurrence estimated in one jurisdiction as over 10,000 incidents annually [11]. Despite these reports, there is a paucity of scientific research evidence about the prevalence, contributing factors or harm reduction strategies [8, 12].

This systematic review examines the published research on the frequency, nature, contributing factors and outcomes of physical RRA in the nursing home setting.

Methods

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement [13] and consisted of acquiring, extracting and assessing the data (Figure 1).

Databases

The following major databases for the disciplines of medicine and nursing (including geriatrics, public health, behavioural sciences, mental health, forensic medicine and preventive medicine) were searched: Ovid MEDLINE, EMBASE, CINAHL (via EBSCOHOST), COCHRANE DATABASE OF SYSTEMATIC REVIEWS, PsycINFO (via EBSCOHOST), Web of Science and Scopus.

Search strategy

Key terms were reviewed independently by each researcher. Additional terms identified during individual database searches were added to a master list, and the final search included the entire list for every database. L.B. and N.F. conducted the same search separately, using a combination of search terms to describe RRA, injury and death and nursing homes (Supplementary data, Appendix S1 available in

Age and Ageing online). A bibliographic review of included articles was conducted to identify additional relevant studies.

Selection criteria

The eligibility criteria for inclusion comprised:

- Original research published in a peer-reviewed journal;
- Between 1st January 1949 and 31st December 2013;
- In English, French, German, Italian or Spanish;
- Population was nursing home residents;
- Examined resident-to-resident physical aggression.

Records were excluded if found to be duplicates, referred to incidents of aggression by a resident directed towards non-residents or incidents that took place in a setting other than nursing homes. Records were also excluded if the publication type was an address, bibliography, biography, case report, comment, conference abstract, dissertation, thesis, editorial, festschrift, guideline, historical article, tutorial, interview, patient education handout or portrait.

Results were exported into Endnote X5 software (Thomson Reuters, 2010). Duplicates were removed using a standard function before each entry was screened for eligibility, initially by title and abstract, then by full text. Inclusion was assessed via consensus between B.M. and N.F. The final selection, including bibliographic review of selected papers to screen for additional records, was made by consensus between B.M., N.F. and J.E.I.

Data extraction

Data items were extracted and recorded into an Excel spreadsheet (Microsoft Corporation, 2010). Information of interest comprised general study and population characteristics such as study period, date of publication, location, research design, data sources and analysis, prevalence, nature, predisposing factors of exhibitors and targets of aggression, triggers of and response to aggression, study aim, salient findings and study limitations. Coding decisions were made by agreement between three of the researchers (N.F., B.M., and J.E.I.).

The quality of the quantitative studies was made by agreement between B.M., L.B. and J.E.I. using a modified Newcastle Ottawa Scale [14]. The qualitative studies level of adherence to guidelines outlined by the consolidated criteria for reporting qualitative research (COREQ) [15] was made by agreement between B.M. and J.E.I.

Data analysis

The review sought to describe:

- Prevalence and nature of resident-to-resident physical aggression including outcomes;
- Predisposing factors and triggers associated with RRA; and
- Implemented and recommended management measures.

Potential risk factors were classified using a modified version of the social-ecological model of health [16] into three

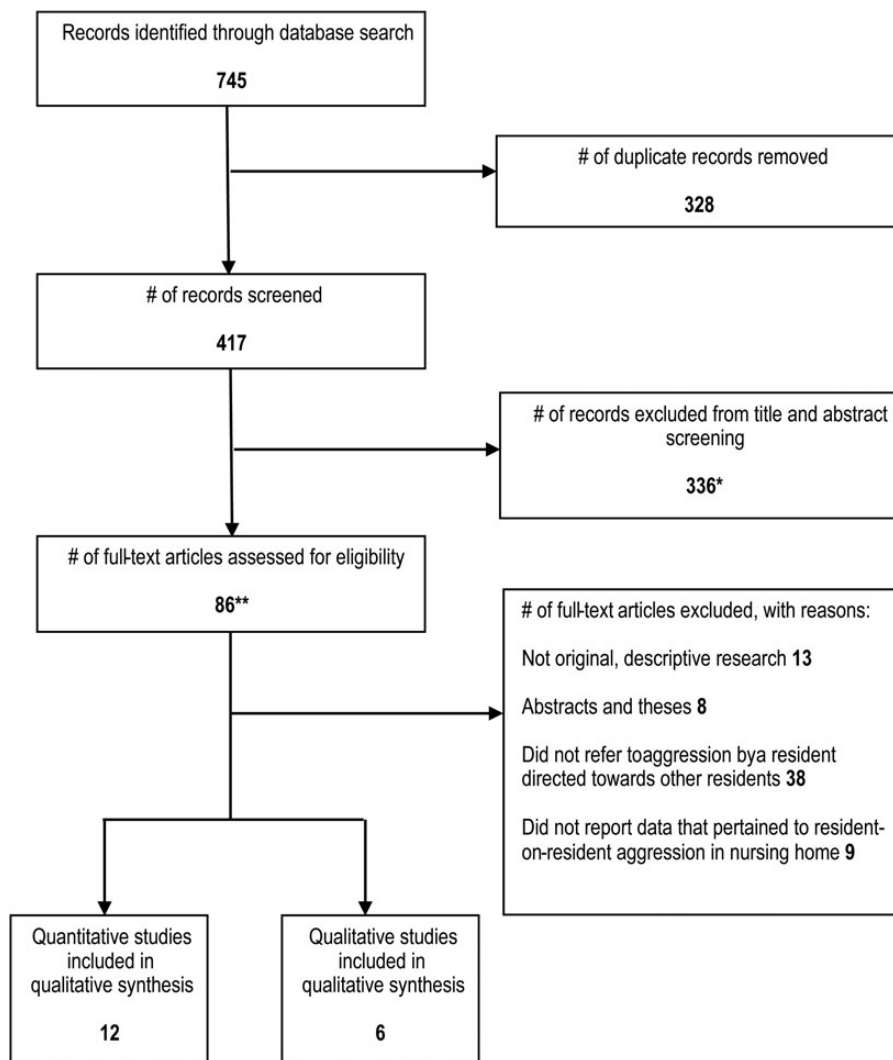


Figure 1. PRISMA flow diagram identification, screening, eligibility and included articles. *Did not describe physical aggression leading to injury or death between nursing home residents; not peer-reviewed journal articles; not published in English, French, Italian, German or Spanish. **Five articles were identified by bibliographic review.

categories: individual (to include both intra- and interpersonal factors), organisational and structural (including societal and policy factors).

Results

Study selection

The combined searches yielded 745 records of which 18 articles were eligible for inclusion (Figure 1).

Study characteristics

All studies were published in English, with the earliest published in 1993, and the majority ($n = 13$) were conducted in the USA. Most ($n = 12$) were quantitative design (Table 1) of which one was a randomised controlled trial [17]; the remainder ($n = 6$) were qualitative (Table 2). Half of the studies ($n = 9$) focussed specifically on RRA, while the remainder investigated incidents of RRA in the broader context of nursing home

violence. The studies were too varied in purpose, design and location to be analysed in an aggregate form.

The majority of quantitative data was collected retrospectively ($n = 9$), most commonly directly from staff ($n = 5$) or from incident reports ($n = 5$). The number and size of facilities varied considerably. Among these studies, resident demographics were homogenous; being predominantly female, in their early eighties, with a diagnosis of cognitive impairment and/or dementia (79.7%) [18–20], and many had some form of physical impairment and behavioural disturbances.

All qualitative studies collected data retrospectively from staff members, with sample sizes ranging from 11 to 103 staff participants. Two of these studies also obtained information directly from residents who had witnessed RRA [21, 22]. The majority of qualitative studies ($n = 5$) collected data using semi-structured interviews [21, 23–26], two of the studies conducted on focus groups [22, 25], and one study involved direct observation of RRA events by the researchers [21].

Table 1. Description of quantitative studies on RRA

Study	Aim	Country, State	Method						Sample description						RRA findings					Quality of study
			Design	Data source	Follow-up (months)	Geo setting	Nursing homes (n)	Facility size	Number of residents	Age mean years (range)	Male (%)	Dementia (%)	Physically impaired (%)	BPSD (%)	Prevalence of RRA	Predisposing factors	Triggers	Incident	Interventions	
Malone <i>et al.</i> [30]	Describe the incidence and characteristics of aggressive behaviours in a group of institutionalized elderly.	USA	R, Co	InRp	12	–	1	L	–	84 (76–92)	20	–	–	–	62% of aggressive incidents (n = 58/94)	–	–	–	–	6
Allen <i>et al.</i> [27]	Organizational characteristics associated with complaints to Ombudsman.	USA, CT	R, Cs	2 InRp, OHS	24	B	261	S, L	–	–	–	–	–	5% of abuse complaints (n = 14/269)	–	–	–	–	2	
Shinoda <i>et al.</i> [32]	Nature of injuries and risk factors.	USA, MA	R, CC	2 InRp, OHS	12	B	–	–	1,132	81 (18–101)	48	76	58	20	–	+	+	+	–	5
Jogerst <i>et al.</i> [28]	To determine whether there is an association between ombudsman report rates of nursing home abuse and ombudsmen's public and staff education, investigative process, program expenditures and census demographics.	USA	R, Co	2 InRp, OHS	72	B	–	–	–	–	–	–	–	3.4 incidents per 1,000 beds per year	–	–	–	–	5	
Almvik <i>et al.</i> [18]	Incidence and nature of violent incidents.	Norway	P, Co	1 St	3	–	4	S, L	82	82 (56–104)	44	78	–	18	9% of violent incidents (n = 19/210)	–	–	–	–	7
Lachs <i>et al.</i> [31]	Nature of police contact with NH residents.	USA, CT	R, Co	2 InRp, Po	120	B	–	–	747	84	31	50	75	–	89% of police reported incidents (n = 71/79)	+	+	+	–	7
Lindner <i>et al.</i> [34]	Causes and manners of death.	USA, PA	R, Co	2 FP	132	B	–	–	–	–	–	–	–	–	0.5% of NH deaths reported to coroner (n = 1/207)	–	–	+	–	5
Pulsford <i>et al.</i> [29]	Causes and most effective ways of responding to aggressive behaviour by older people with dementia.	UK	P, Co	1 St	3	–	4	–	31	–	–	100	–	–	31.6% of staff reported incidents (n = 25/79)	–	–	–	–	6
Castle [33]	Incidence of RRA.	USA	R, Co	1 St	0	B	249	S, L	–	–	–	–	–	–	–	–	–	+	–	3
Zhang <i>et al.</i> [20]	Incidence and risk factors for RRA.	USA, MI	R, Cs	2 Fa Sur	0	B	–	–	2,004	84	28	86	22	22	–	+	–	–	–	4
Brazil <i>et al.</i> [19]	Prevalence and nature of RRA at admission and 3 months later.	Canada	P, Co	1 St	3	R	3	L	339	84 (37–103)	32	60	–	–	23% of residents (n = 79/339)	+	–	+	–	7
Teresi <i>et al.</i> [17]	Effect of training on intervention and reporting of RRA.	USA, NY	RCT	1 St	42	U	5	L	1,405	85	27	–	–	–	–	–	–	–	+	–

General: +, reported in article; –, not stated/specified; Y, Yes; N, No.

Design: R, retrospective; P, prospective; Cs, cross-sectional; CC, case-control; Co, cohort; RCT, randomised control trial.

Data source: 1, primary; 2, secondary; InRp, incident reports; OHS, occupational health and safety reports; St, staff; Po, police reports; FP, forensic pathology reports; FaSur, Family survey.

Geo setting: U, urban; R, rural; B, both.

Facility size: S, small (<60 beds); L, large (60+ beds).

Quality of study: A maximum score of 8 is possible. Each study was evaluated using the following criteria for an optimal cohort study design: representativeness of the exposed cohort, selection of the non-exposed cohort, ascertainment of exposure, whether outcome present at start of study, comparability of cohort, assessment of outcome, duration and adequacy of follow-up.

Table 2. Description of qualitative studies on RRA

Study	Aim	Country	Method					Analysis			RRA findings				Quality of study
			Theoretical framework	Setting	Sample size	Sample description	Data collection	Number of data coders	Derivation of themes	Participant checking	Predisposing factors	Triggers	Incident details	Interventions	
Sandvide <i>et al.</i> [23]	Cause of violent events from eyewitness care providers.	Sweden	QDA	NH, GD, SH	61	St	Int	1	Y	Y	–	–	–	–	14
Rosen <i>et al.</i> [8]	To characterize the spectrum of RRA.	USA	–	NH	103	St, Res	Foc	–	Y	N	+	+	+	+	15
Pillemer <i>et al.</i> [21]	To thematically analyse and categorise types of RRA.	USA	SEM	NH	–	St, Res	Int, Obs	4	Y	N	–	+	–	–	16
Sifford-Snellgrove <i>et al.</i> [24]	Characteristics of victims and initiators of RRA.	USA	NDB	NH	11	St	Int	2	Y	N	+	–	–	–	21
Duxbury <i>et al.</i> [25]	Causes and most effective ways of responding to aggressive behaviour.	UK	–	NH	16	St, Rel	Int, Foc	–	Y	Y	–	–	–	+	16
Snellgrove <i>et al.</i> [26]	To determine potential triggers for RRA.	USA	NDB	NH	11	St	Int	2	Y	N	–	+	–	–	22

General: +, reported in article; –, not stated/specified; Y, Yes; N, No.

Theoretical framework: QDA, qualitative descriptive analysis; SEM, social ecological model; NDB, need-driven dementia-compromised Behaviour model.

Setting: NH, nursing homes; GD, group dwelling; SH, sheltered housing.

Sample description: Res, residents; Rel, relatives; St, staff.

Data collection: Int, interviews; Obs, observation by researcher; Foc, focus groups.

Quality of study: A maximum score of 32 is possible. Each study was evaluated using the following criteria for an optimal description of a qualitative study design: Domain 1: Research and reflexivity—Personal characteristics;

Relationship with participants. Domain 2: Study design—Theoretical framework; Participant selection; Setting; Data collection. Domain 3: Analysis and findings—Data analysis; Reporting.

Study findings

Prevalence of RRA

The method of reporting the frequency of RRA was inconsistent and incomplete across the studies to calculate prevalence using the same denominator.

Among quantitative studies, the frequency of RRA was most commonly reported as the number of incidents (ranging from 1 to 71). The majority of these studies reported the prevalence of RRA episodes albeit in considerably different ways (e.g. as a percentage of care complaints [27], as an average of aggressive incidents per 1,000 beds per year [28] or as a proportion of events reported in incident forms completed by staff [29, 30]).

Two qualitative studies [21, 23] reported the frequency of RRA based on information from staff and other residents witness to RRA incidents (61 and 122 incidents, respectively).

Predisposing factors

Quantitative studies using incident and police reports [31] and staff reports [19] described the characteristics of residents involved in RRA without specifying their role in the incident (exhibitor or target) [19, 31]. These residents were likely to be female [31], cognitively impaired (50.0 and 75.0%, respectively) [19, 31], have impairments in activities of daily living (ADL) [31] and exhibit higher levels of behavioural expressions than residents not involved in an incident [19]. It was not uncommon for residents to be involved in repeated episodes of RRA as both the exhibitor and target [31].

Targets of RRA. Predisposing factors for RRA targets were examined in two quantitative studies using incident reports [32] and family surveys [20], which found that targets were more likely to be female [20, 32], cognitively impaired (95.2%) [32], less dependent in their ADL [20, 32], exhibit wandering behaviours [32], demonstrate socially inappropriate or disruptive behaviours [20, 32] and were described as 'getting in harm's way' [32]. Interestingly, RRA targets were also more likely to have been abused by staff as well [20, 32].

Aspects of the target profile were supported by the qualitative studies with staff and resident focus groups [22] and interviews with staff [24], which found that targets exhibited a combination of behavioural issues and cognitive impairment, and were mobile enough to find themselves in contentious situations with other residents [22, 24].

Exhibitors. Characteristics of residents who exhibited aggressive behaviours were described in two qualitative studies based on information from staff and resident focus groups [22] and staff interviews [24]. Exhibitors were more likely to be cognitively aware [24] and intolerant of residents with cognitive impairment [22, 24], exhibit more aggressive behaviours [22, 24] and have fewer ADL impairments than the general nursing home population [24].

Organisational factors. Organisational factors contributing to the occurrence of RRA were not examined in any of the studies. One quantitative study [27] identified organisational factors associated with higher rates of abuse complaints in general and found that for-profit homes located in non-rural areas had a higher rate of abuse complaints. Nursing homes with unionised staff were more likely to have abuse complaints filed [27]. One qualitative study discussed the environmental design of the nursing home as a possible contributory factor for aggressive behaviour, particularly with regard to physical and personal space [25].

Triggers

Three qualitative studies [21, 22, 26] focused on describing the triggers for RRA. The most commonly reported trigger was communication issues, such as misunderstandings between residents due to either party's cognitive impairment [26], hearing impairment [26], mumbling/stuttering [26], inability to find the right words to express a thought [26], repetitive communication patterns [26], loud vocalisations [26], teasing or joking [21] or speaking a different language [22]. Invasion of space was the second most commonly reported trigger and included issues associated with communal living such as roommate disagreements [22], territoriality [22, 26] and privacy [21].

In contrast to these findings, two quantitative studies reported that RRA incidents commonly occurred in the absence of a trigger, with no apparent provocation [31, 32].

Nature of incidents

Details of RRA incidents were described in four quantitative studies [31–34] and one qualitative study [22]. One study based on incident reports found that the majority of RRA occurred in the afternoon or evening in common living areas [31]; this was supported by qualitative findings from staff and resident focus groups [22]. In contrast, a later quantitative study based on staff reports of RRA found that the majority occurred in the injured resident's room, although public spaces such as hallways and dining rooms were also common [32].

Only one study described the types of physical aggression and found the most common forms of RRA to be pushing, grabbing and pinching [33].

Overall, the outcome of incidents and consequences for the targets was unreported or lacking in detail. Among RRA incidents reported to the police, one-third resulted in injury, although the nature of the injury was not specified [31]. One study reported the most common injuries were bruises, lacerations and haematomas, most frequently to the head and face [32]. Importantly, only one study reported a death of a resident from blunt force trauma to the head after being pushed by another resident [34].

Interventions

Intervention methods specific to RRA were described in one randomized control study that found staff training significantly

increased recognition and reporting of RRA, but did not show a reduction in incidence of RRA [17].

Two quantitative studies using staff surveys [29] and incident reports [18, 29] described methods for managing resident aggression in general, finding that preferred methods for intervening during an incident were to de-escalate the situation with minimal use of medication and physical restraints, relying mainly on effective communication techniques [18, 29]. In 42 (20%) of 210 cases, communication alone was sufficient to effectively respond to RRA incidents [18]. These findings were supported by a qualitative study using interviews and focus groups with staff that found a compassionate approach using communication rather than medication or physical restraints was favoured [25].

In contrast, staff and resident focus groups in one study described a more impersonal approach for managing RRA, whereby the majority of staff would respond by notifying social services and moving the exhibitor to a different bedroom [22].

Discussion

Key findings

This systematic review examined 18 studies published in peer-reviewed journals since 1949 to characterise the phenomenon of RRA in nursing homes. RRA is ubiquitous with serious consequences for residents. Although physical injuries were rarely reported, each study described the negative social and psychological effects of aggression on the quality of life of nursing home residents.

To our knowledge, this is the most recent and extensive systematic review conducted globally on RRA. Our findings are similar to Rosen *et al.* [8] who state that RRA is a phenomenon that remains difficult to characterise owing to the paucity of pertinent studies, the lack of detailed information about RRA incidents and diversity of results among studies. Most studies were published after 2000 suggesting RRA is an under-recognised issue globally.

The prevalence of RRA is difficult to ascertain due to variation in definitions, data collection and the population at risk. When RRA was reported as a proportion of total number of incidents, the prevalence of RRA ranged from 0.5% (1/207) of nursing home deaths reported to the medical examiner [34] to 89% (71/79) of incidents in the nursing home reported to the police [31]. When reported as a proportion of the total number of residents, the prevalence ranged from 3.4 incidents per 1,000 beds per year [28] to 23% (79/339) of residents [19], the latter being comparable to the rate of resident–staff assaults [35].

The residents who are at increased risk of becoming targets are cognitively impaired yet have sufficient mobility 'to put themselves in harm's way' [32]; these characteristics are common to one-third to one half of nursing home residents with dementia in high-income countries [5].

RRA exhibitors included those who were more aggressive [22, 24], aware of their surroundings [22] and with fewer ADL impairments than the general nursing home population [24].

Organisational factors were not examined by the identified studies. This is unfortunate as factors including the facility location, number of beds and provider type may be useful in understanding abuse and care issues [27].

The outcome of RRA was seldom reported. Three studies [28, 30, 33] reported significant harm or death although the data sources used in two of the studies are inherently biased towards more severe incidents, one study using police reports, [31] and another medical examiner data [34]. The lack of reported severe injury or deaths is puzzling as there are media [11, 36] and legal case reports [37] that this occurs.

Strengths and limitations of the systematic review

This is the most extensive and recent systematic review as our search included literature published in several languages, dating from 1949 and included quantitative and qualitative studies. Scoring the quality of studies is a contentious area [38]. We applied recognised reporting standards and determined that 5 of the 18 studies reviewed met less than half of the specified criteria.

A limitation is the exclusion of grey literature, doctoral dissertations and theses and any legal case reports. Another limitation is the use of witness reports from staff or other residents, occupational health and safety or police reports as data sources, rather than objective observers with research expertise. There is a loss of fidelity in the nature and comprehensiveness of information gathered at each level. Importantly, information was not obtained from RRA exhibitors and targets, presumably due to the high prevalence of cognitive impairment in this population [8]. Finally, our systematic review does not address other important forms of RRA such as bullying behaviours or sexual aggression, and the involvement of residents with serious mental illness in RRA. These issues are substantive and require separate analysis.

Implications and conclusions

This systematic review consolidates the current state of knowledge about RRA in nursing homes. Future research ought to investigate RRA in greater depth and breadth. This should include an examination of RRA in other understudied care settings (e.g. assisted living residences) [39], the development of a standardised definition of RRA, objective and validated instruments [40] and more detailed yet contentious data-gathering mechanisms (e.g. audio–visual recording) [41].

Clinical practice must inform and incorporate the accumulating research findings for the prevention and management of RRA. Expert consensus advocates the use of non-pharmacological interventions as the first line of treatment [42, 43], and education programs designed to help staff recognise and diffuse situations that may lead to incidents are already emerging [44]. Lastly, redesigning the nursing home environment may also be beneficial [45–49].

Policy reforms are essential if RRA is to be eliminated. Specifically, increasing access to regulatory and legal information and enhancing the nature of the investigation to include broader descriptions of the incident, nursing home

environment, staffing profile and training and the inclusion of RRA-specific variables in routinely collected data sets [50]. Policy reform is also required to de-stigmatise RRA away from a criminal form of elder abuse towards a mature and compassionate approach that reflects this as an expression of frustration from residents with unmet needs.

Individual-level factors may be transferable as the studies investigated nursing home residents with characteristics similar across the world. Whether organisational (nursing home) and structural (societal and policy) factors are transferable is more contentious as most studies were conducted in the USA. There is substantial diversity between nations in their approach to aged care, nursing homes and laws.

It is vital that we continue to grow our knowledge base on the nature of RRA to prevent harm to an increasing vulnerable population of nursing home residents and ensure a safe working environment for staff. This is a responsibility that extends beyond nursing homes to the whole of society.

Key points

- RRA is an understudied form of elder abuse in nursing homes.
- The prevalence of RRA is difficult to ascertain due to variation in definitions, data collection methods and the population at risk in the small number of identified studies ($n = 18$).
- RRA commonly occurred between exhibitors with higher levels of cognitive awareness and physical functionality and a history of aggressive behaviours, and female targets who were cognitively impaired with a history of behavioural issues including wandering.
- RRA most commonly took place in the afternoon in communal settings, was often triggered by communication issues and invasion of space, or was unprovoked.
- This review identified gaps in the existing literature on RRA for which further research is required including: environmental factors, outcomes and interventions.

Authors' contributions

J.E.I. contributed to study conception and design, data interpretation, critical revision of article draft and final approval. N.H. and B.M. contributed to study design, data collection, analysis and interpretation, drafting the article and final approval. L.B. contributed to study design, data collection, analysis and interpretation, critical revision of the article draft and final approval. M.W., D.L., L.F. and D.R. contributed to study design, critical revision of the article draft and final approval.

Conflicts of interest

None declared.

Funding

Funding support for this work was provided by Department of Health, Aged Care Branch, Victoria, Australia. The Department of Health did not contribute or influence the study design or findings.

Supplementary data

Supplementary data mentioned in the text are available to subscribers in *Age and Ageing* online.

References

Here only the first 50 references have been listed. The full list of references supporting this review is available on Supplementary data, Appendix S1–S3 available in *Age and Ageing* online.

1. Adult Social Care Statistics. Abuse of Vulnerable Adults in England: 2011-12, Final Report, Experimental Statistics. Leeds, UK: Health and Social Care Information Centre, 2013.
2. World Health Organization. A Global Response to Elder Abuse and Neglect: Building Primary Health Care Capacity to Deal with the Problem Worldwide: Main Report. Geneva, Switzerland: World Health Organization, 2008.
4. Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. eds. World Report on Violence and Health. Geneva, Switzerland: World Health Organization, 2002.
7. Gorbien MJ, Eisenstein AR. Elder abuse and neglect: an overview. *Clin Geriatr Med* 2005; 21: 279–92.
8. Rosen T, Pillemer K, Lachs M. Resident-to-resident aggression in long-term care facilities: an understudied problem. *Aggress Violent Behav* 2008; 13: 77–87.
10. Rosenberg ML, Butchart A, Mercy J, Narasimhan V, Waters HMS M. Interpersonal violence. In: Jamison DT, Breman JG, Measham AR, eds. *Disease Control Priorities in Developing Countries*, 2nd edition. Washington, DC: World Bank, 2006.
13. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med* 2009; 6: e1000097.
17. Teresi JA, Ramirez M, Ellis J *et al.* A staff intervention targeting resident-to-resident elder mistreatment (R-REM) in long-term care increased staff knowledge, recognition and reporting: results from a cluster randomized trial. *Int J Nurs Stud* 2013; 50: 644–56.
18. Almvik R, Rasmussen K, Woods P. Challenging behaviour in the elderly—monitoring violent incidents. *Int J Geriatr Psychiatry* 2006; 21: 368–74.
19. Brazil K, Maitland J, Walker M, Curtis A. The character of behavioural symptoms on admission to three Canadian long-term care homes. *Aging Ment Health* 2013; 17: 1059–66.
20. Zhang Z, Page C, Conner T, Post LA. Family members' reports of non-staff abuse in Michigan nursing homes. *J Elder Abuse Neglect* 2012; 24: 357–69.
21. Pillemer K, Chen EK, Van Haitsma KS *et al.* Resident-to-resident aggression in nursing homes: results from a qualitative event reconstruction study. *Gerontologist* 2012; 52: 24–33.
22. Rosen T, Lachs MS, Bharucha AJ *et al.* Resident-to-resident aggression in long-term care facilities: insights from focus groups

- of nursing home residents and staff. *J Am Geriatr Soc* 2008; 56: 1–11.
23. Sandvide A, Astrom S, Norberg A, Saveman BI. Violence in institutional care for elderly people from the perspective of involved care providers. *Scand J Caring Sci* 2004; 18: 351–7.
 24. Sifford-Snellgrove KS, Beck C, Green A, McSweeney JC. Victim or initiator? Certified nursing assistants' perceptions of resident characteristics that contribute to resident-to-resident violence in nursing homes. *Res Gerontol Nurs* 2012; 5: 55–63.
 25. Duxbury J, Pulsford D, Hadi M, Sykes S. Staff and relatives' perspectives on the aggressive behaviour of older people with dementia in residential care: a qualitative study. *J Psychiatr Ment Health Nurs* 2013; 20: 792–800.
 26. Snellgrove S, Beck C, Green A, McSweeney JC. Resident-to-resident violence triggers in nursing homes. *Clin Nurs Res* 2013; 22: 461–74.
 27. Allen PD, Kellett K, Gruman C. Elder Abuse in Connecticut's Nursing Homes. *J Elder Abuse Neglect* 2004; 15: 19–42.
 28. Jogerst G, Daly J, Hartz A. Ombudsman program characteristics related to nursing home abuse reporting. *J Gerontol Soc Work* 2005; 46: 85–98.
 29. Pulsford D, Duxbury JA, Hadi M. A survey of staff attitudes and responses to people with dementia who are aggressive in residential care settings. *J Psychiatr Ment Health Nurs* 2011; 18: 97–104.
 30. Malone M, Thompson L, Goodwin J. Aggressive behaviors among the institutionalized elderly. *J Am Geriatr Soc* 1993; 41: 853–6.
 31. Lachs M, Bachman R, Williams CS, O'Leary JR. Resident-to-resident elder mistreatment and police contact in nursing homes: findings from a population-based cohort. *J Am Geriatr Soc* 2007; 55: 840–5.
 32. Shinoda-Tagawa T, Leonard R, Pontikas J, McDonough JE, Allen D, Dreyer PI. Resident-to-resident violent incidents in nursing homes. *JAMA* 2004; 291: 591–8.
 33. Castle NG. Resident-to-resident abuse in nursing homes as reported by nurse aides. *J Elder Abuse Neglect* 2012; 24: 340–56.
 34. Lindner JL, Omalu BI, Buhari AM, Shakir A, Rozin L, Wecht CH. Nursing home deaths which fall under the jurisdiction of the coroner: an 11-year retrospective study. *Am J Forensic Med Pathol* 2007; 28: 292–8.
 39. Caspi E. Aggressive behaviors between residents with dementia in an assisted living residence. *Dementia (Lond)* 2013. [Epub ahead of print].
 41. Bharucha AJ, London AJ, Barnard D, Wactlar H, Dew MA, Reynolds CF 3rd. Ethical considerations in the conduct of electronic surveillance research. *J Law Med Ethics* 2006; 34: 611–9. 482.
 45. Fleming R, Crookes P, Sum S. *A Review of the Empirical Literature on the Design of Physical Environments for People with Dementia*. Sydney, Australia: Dementia Collaborative Research Centre: Assessment and Better Care Outcomes, 2008.
 46. Zeisel J, Silverstein NM, Hyde J, Levkoff S, Lawton MP, Holmes W. Environmental correlates to behavioral health outcomes in Alzheimer's special care units. *Gerontologist* 2003; 43: 697–711.
 47. Cohen-Mansfield J, Werner P, Marx MS. The social environment of the agitated nursing home resident. *Int J Geriatr Psychiatry* 1992; 7: 789–98.
 48. Negley EN, Manley JT. Environmental interventions in assaultive behavior. *J Gerontol Nurs* 1990; 16: 29–33.
 49. Holmberg SK. Evaluation of a clinical intervention for wanderers on a geriatric nursing unit. *Arch Psychiatr Nurs* 1997; 11: 21–8.

Received 28 July 2014; accepted in revised form 12 November 2014